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10/525,703	08/03/2005	Heikki Ruotoistenmaki	1016050-000084	4982
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STOUT, MICHAEL C				
ART UNIT		PAPER NUMBER		
3736				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary

Application No.

10/525,703

Applicant(s)

RUOTOISTENMAKI, HEIKKI

Examiner

MICHAEL C. STOUT

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/CIS-100)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____
- Paper No(s)/Mail Date 3/3/2006.

DETAILED ACTION

This detailed action is in regards to United States Patent Application 10/525703 filed on 8/3/2005 and is a first action based on the merits of the application.

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claim(s) 1-11, drawn to a pressure sensor.

Group 2, claim(s) 12-14, drawn to a method of using a sensor to measure heart rate and respiratory amplitude.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

All of the common technical features of claims 1 and 12 are known in the prior art as taught by Freakes et al. (WO 2002/31461 A1) in view of Reuter (US 4974679).

There is a clear lack of unity of the invention because the common matter of the independent claims is well known and the remaining subject matter of each claim differs from that of the others without there being any unifying novel inventive concept.

During a telephone conversation with Wendy Weinstein on February 8th 2008 a provisional election was made without traverse to prosecute the invention of I, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-14 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result**

in a loss of the right to rejoinder. Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Drawings

The drawings are objected to because the #1 in Figure 1 has been cut off from the figure and #1 is not shown in other figures. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of

any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 8 is objected to because of the following informalities: Claim 8 directed toward a sensor wherein an output signal is provide with the change of a load applied to the cover is less than 10^{-6} x the load rating of the cover. This limitation as claimed includes detection ranges beyond the scope of that set forth in the specification and beyond the limits of the technology. Such a limitation of less than 10^{-6} , would also include 10^{-12} and 10^{-18} , and further include infinitesimal changes in the cover load.

Claim 3 is objected to because the use of the term "its" is unclear and should be replaced with --flexible diaphragm--.

Claim 3 is objected to because the specification discloses the flexible diaphragm being comprised of metal and comprising a piezoelectric sensor diaphragm.

Claim 4 is objected to because the specification discloses the sensor diaphragm being comprised of a piezoceramic diaphragm not further comprising another diaphragm.

Claim 4 is objected to because "a diameter smaller than that of the metal diaphragm" lacks antecedent basis and should be replaced with --the flexible diaphragm--.

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Claim 9 is objected to because it is unclear what the "a settling time" is a settling time of. , i.e. the impedance is matched to provide a desired settling time.... of what?.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

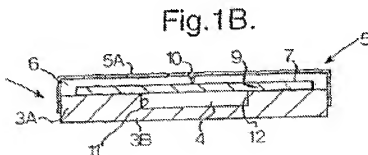
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes et al. (WO 2002/31461 A1) in view of Reuter (US 4974679).

Freakes teaches a force or pressure sensor, comprising a substantially rigid, mechanical-load resistant frame (frame 3A), a flexible diaphragm secured over its peripheral rim to the frame (substrate 7), and a piezoelectric sensor diaphragm applied to the surface of the flexible diaphragm (SAWs device Y is laid down on the substrate, see Page 5, Paragraph 2) wherein the sensor diaphragm loading element comprises a substantially rigid cover capable of carrying mechanical loading (lid 5) wherein the cover includes a protrusion or shoulder (projection 10), bearing against a middle section of the flexible diaphragm and thus (see Figure 1B),



by deflection, prestressing the flexible diaphragm and the piezoelectric sensor diaphragm attached thereto (a recess 10 is formed in the lid and presses on the central

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region of the substrate, see Abstract and Page 5, Paragraph 4), and wherein the frame and the cover define therebetween a closed housing chamber (see Figure above), the flexible diaphragm and the piezoelectric sensor diaphragm being located there inside (see Figure 1B).

Reuter teaches a load cell having a cover capable of carrying a mechanical loading of more than 50 kg (the button in Figure 1E is preferred for load cells with more than 50kg ratings, see Column 5, Lines 23-31).

Both Freakes and Reuter teaches load sensing devices.

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the device taught by Freakes by making the cover capable of carrying mechanical loading of more than 50kg as taught by Reuter in order for the device to operate in environments requiring at least a 50kg load to be detected thereby increasing the usability of the sensor, see Column 5, Lines 23-31.

Regarding claim 2, Freakes in view of Reuter teaches the device wherein the frame, cover and the flexible diaphragm are rotationally symmetrical relative to the cover protrusion or shoulder (Freakes teaches a device which is symmetrical about the cover protrusion but does not teach the device wherein the sensor diaphragm is rotationally symmetrical, however in Figures 2 and 3 Reuter teaches a device wherein the piezoelectric diaphragm is rotationally symmetrically about the center of the diaphragm by mounting the diaphragm below the flexible diaphragm about a protruding member which increases sensitivity of the piezoelectric element to deflection. It would have been obvious to a person of ordinary skill in the art to modify the device disclosed

by Freakes by symmetrically placing the sensor diaphragm beneath the protrusion as taught by Reuter in order to increase the sensitivity of the device because a force delivered by the protrusion will be acting directly above the SAW element.

Regarding claim 10, Freakes in view of Reuter further teaches the sensor of claim 1, wherein the closed housing chamber is hermetically sealed (the lid and base materially are preferably impermeable to gas and the seal between the lid and the base is also preferably impermeable to gas, see Freakes Page 5, Paragraph 1).

Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes in view of Reuter as applied to claim 1 above, and further in view of Guscott et al. (US 4228379).

Regarding claim 3, Freakes/Reuter teaches the device wherein the flexible diaphragm comprised of a substrate (7), having its peripheral rim secured between the edges of the frame and the cover (substrate may be secured to the base by means of an adhesive, see Freakes Page 5, Paragraph 3, Figure 1 shows the substrate is secured between the edges of top of the frame and inside cover).

Freakes fails to teach the device wherein the diaphragm is metal.

Guscott teaches a transducer device comprising a metal diaphragm.

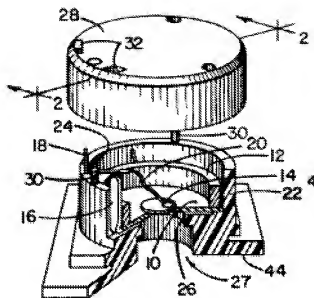
Both Freakes/Reuter and Guscott teach transducer devices.

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the device taught by Freakes/Reuter to include a metal diaphragm as taught by Guscott in order to employ a metal diaphragm which has improved immunity to environmental and aging conditions, see Guscott Column 2, Line 60 through Column 3, Line 8.

Regarding claim 7 Freakes in view of Reuter teaches the device of claim 1 as set forth above. aim 1 as set forth above.

Freakes in view of Reuter fails to teach the device wherein the frame and cover comprise elements in the shape of bodies of revolution.

Guscott teaches a transducer device wherein the cover (28) and frame (22) and diaphragm (10) are rotationally symmetrical wherein the frame and cover comprise elements in the shape of bodies of revolution.

**FIG. 1**

Both Freakes/Reuter and Guscott teach transducer devices.

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the device taught by Freakes/Reuter to include a rotationally symmetrical frame and cover comprised of bodies of revolution as taught by Guscott in order to provide a circular unit which can be incorporated into fluid pressure monitoring devices connected to circular tubes and because circular frames, covers and diaphragms, covers and frames are all old and well known in the art.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes in view of Reuter as applied to claim 1 above, and further in view of Bagdassarian et al. (US 4393321)

Freakes in view of Reuter teaches the device of claim 1, wherein the sensor diaphragm comprised of a SAWS diaphragm (Y), having a diameter smaller than that of the flexible diaphragm (See Figure 1A), further wherein the sensor diaphragm has its peripheral rim at a distance from the inner periphery of the housing chamber (Figures 1A and 1B shows the edge of the SAW diaphragm a distance from the inner periphery of the housing chamber).

Freakes fails to teach the SAW diaphragm comprised of a piezoceramic material.

Bagdassarian teaches a SAW device comprised of piezoceramic substrate, see Figure 1 and Column 4, Lines 35-45).

Both Freakes and Bagdassarian teach SAW devices.

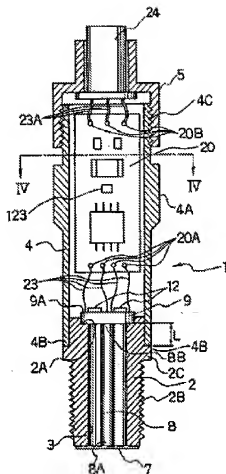
Thus it would have been obvious to a person of ordinary skill in the art to modify the device taught by Freakes to include piezoceramic material as taught by Bagdassarian in the SAW diaphragm in order to provide a material to ensure acoustic wave propagation because when there is a design need or market pressure to solve a problem and there are a number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product is not of innovation but of ordinary skill and common sense.

Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes et al. (WO 2002/31461 A1) in view of Reuter (US 4974679) and Kusakabe et al. (EP0710827).

Freakes in view of Reuter teaches the sensor of claim 1 as set forth above.

Freakes fails to teach the sensor wherein an amplifier and a circuit board are located in said housing chamber.

Kusakabe teaches a pressure sensor wherein an amplifier (121) and a circuit board (20) are located in a housing chamber, see Figure 1 and Column 7, Lines 35-50.



Both Freakes and Kusakabe teach pressure sensor devices. Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the device taught by Freakes to include a circuit board and amplifier in the housing as taught by Kusakabe in order to provide a pressure detecting circuit connected to the diaphragm elements and provide a means for adjusting the gain of the circuit, see Kusakabe Column 7, Lines 35-50.

Regarding claim 9, Freakes/Reuter/Kusakabe further teaches the device wherein the amplifier has its input impedance matched to provide a desired settling time, during which the amplifier has its output set substantially to zero, while the loading applied to the cover respectively remains essentially unchanged (Kusakabe teaches the device wherein the amplifier output is related to the variation of the detection element from a pressure applied to the diaphragm, Column 1, Lines 47-54 and one of ordinary skill in the art would recognize that when the load is held constant on the housing cover the amplifier should also remain constant since they are related and when no load is applied the output value is zero).

Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes et al. (WO 2002/31461 A1) in view of Reuter (US 4974679) and Kusakabe et al. (EP0710827) and in further view of Sasaki et al (US 5,889873).

Freakes in view of Reuter teaches the sensor of claim 1 as set forth above wherein the flexible diaphragm and the sensor diaphragm are opposite the cover protrusion or shoulder.

Freakes fails to teach the device comprising a sensor-signal transmitting contact spring is in contact with the sensor diaphragm opposite to the cover protrusion or shoulder.

Kusakabe teaches a device wherein the sensing elements are connected to a circuit board via wires, see Figure 2 in order to detect a pressure and amplify a signal.

Kusakabe fails to teach the device wherein the connection is made using spring contacts.

Sasaki teaches a piezoelectric diaphragm device wherein a signal is transmitted using spring contact (323, see Figure 2) in order to dispense with the complicated and time consuming process of soldering, see Column 1, Lines 23-49.

Thus it would have been obvious to a person of ordinary skill in the art to modify the device taught by Freakes to include circuitry as taught by Kusakabe in order to detect pressure and amplify signals by using a spring contact as taught by Sasaki in order to avoid the time consuming process of soldering.

Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes et al. (WO 2002/31461 A1) in view of Reuter (US 4974679) and in further view of Rogne et al. (WO00/55589).

Freakes in view of Reuter teaches the device of claim 1, wherein the housing is capable of withstanding loads of at least 50kg.

Freakes fails to teach a pressure sensor wherein the sensor provides an output when the signal change is less than 10^{-6} than the load rating of the cover, which is the lower limit of the detectable range of the device.

Rogne teaches a pressure sensor with a detection threshold D within a range of about 10^{-7} times the maximum load rating of the device, which is shown as the line F (Failure Line), see Figure 5 and Page 7, Lines 25-30.

Both Freakes/Reuter and Rogne teach pressure sensor devices.

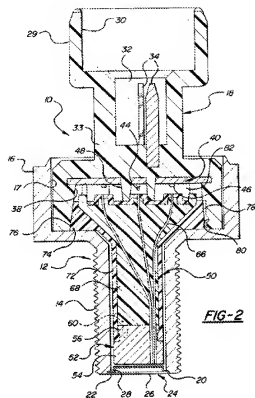
Thus it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the device taught by Freakes/Reuter to have a detectable range of at least 10^{-7} times the maximum load rating of the device as taught by Rogne in order to provide a versatile pressure sensor adapted to be used in various applications requiring different detectable levels, thereby increasing the potential market for the device.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freakes et al. (WO 2002/31461 A1) in view of Reuter (US 4974679) in view of Viduya (US 5706372)

Freakes in view of Reuter teaches the sensor of claim 1 as set forth above, wherein the cover comprises the upper part of the housing of the device and is configured to measure fluid pressure.

Freakes in view of Reuter fails to teach the sensor wherein the cover is provided with an adapter element which enables loading of the cover with changes in a fluid or gas pressure.

Viduya teaches a device wherein the housing comprises an adapter element (threads 14) for fastening the sensor device to a cylinder to measure fluid pressure.



Both Freakes/Reuter and Viduya teach pressure sensor devices.

Thus it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the device cover taught by Freakes/Reuter to include an adapter element as taught by Viduya in order to allow for the fastening of the device to a cylinder for measuring fluid, see Column 2, Lines 15-25).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See Form 892 for pertinent prior art not relied upon, along with additional information of the references cited in this office action.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL C. STOUT whose telephone number is (571)270-5045. The examiner can normally be reached on M-F 7:30-5:00 Alternate (Fridays).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on 571-272-4726. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/M. C. S./

Examiner, Art Unit 3736

/Max Hindenburg/

Supervisory Patent Examiner, Art Unit 3736